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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,312	11/26/2003	Yudong Zhu	GEGR8082.001	8839

7590 05/06/2005

Ziolkowski Patent Solutions Group, LLC
14135 North Cedarburg Road
Mequon, WI 53097

EXAMINER	
SHRIVASTAV, BRIJ B	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/723,312	ZHU, YUDONG	
	Examiner	Art Unit	
	Brij B. Shrivastav	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)

1. Applicant's response dated February 17, 2005 in response to the Office action dated December 20, 2004 has been received. The effective priority date of Katcher et al is earlier than the applicant's declaration date, provided under 37 CRF 1.131. Examiner, therefore, disagrees with applicant disqualifying Katscher et al rejection of claims under 35 U.S.C.102(e).

Examiner, therefore, maintains the previous Office action rejection, which is provided below. Further, a new rejection of the claims under 35 USC 103(a) is also provided.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 7, 8 and 10-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Katscher et al (US 6,828,790).

As regards to claim 1, Katscher et al teach a method of MR imaging, including the steps of determining a desired RF examination profile, and independently driving each transmit coil of a transmit coil array such that a collective excitation generated by the transmit coil array substantially matches the desired RF excitation profile (figure 1-3,

numerals 13, 16; column 3, lines 11-54 columns 4 and 5, lines 1-67 and 1-55; column 7, lines 44-54)

As regards to claim 7, Katscher et al teach an MRI apparatus, including a magnetic resonance imaging (MRI) system having a magnet to impress a polarizing magnetic field (figure 1, numeral 10), a plurality of gradient coils positioned about the bore of the magnet to impose a magnetic field gradient, and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images (figure 1, numerals 11, 12, 13, 15, 16, 25, 26; columns 4-5, lines 1-64 and 1-55); and a computer programmed to apply a plurality of RF pulse waveforms configured to control RF generation by a transmit coil array such that a result of collective RF generation across an imaging volume substantially matches a desired RF excitation profile (figure 1, numeral 20; column 5, lines 32-55; column 7, lines 43-55).

As regards to claim 17, Katscher et al teach a computer readable storage medium having a computer program stored thereon (figure 1, numeral 20, column 3, lines 33-55, column 5, lines) and representing a set of instructions that when executed by a computer causes the computer to control RF transmission by a plurality of transmit coils of a transmit coil array such that spatial and temporal variation in a composite B1 field induces a desired excitation profile upon completion of RF transmission (figure 1, numerals 11, 12, 13, 16, 20, column 5, lines 32-55, column 7, lines 43-65).

Claims 2, 8, 10-16, 18-24 are rejected as Katscher further teaches independently driven computer programmed to design RF pulses applied to linearly arranged coils to

achieve and match the desired and parallel excitation with shorter time length, and further programmed to reduce aliasing and measuring changes in the magnetic field (figure 1, numerals 11, 12, 13, 16, 20; columns 1-2 lines 16-67 and 1-57; column 3, lines 41-55, column 5, lines 32-55).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Den Brink et al (WO 01/96896), and further in view of Boaskamp (US 6,411,090).

As regards to claim 1, Van Den Brink et al teach a method of MR imaging including the steps for collective excitation generated by the transmission coil array matching a desired excitation profile (figure 1, numeral 13; page 2, lines 5-29). However, Van Dan Brink et al do not specifically teach independently driving each transmit coil of the transmit coil array. Boskamp teaches independently driving each transmission coil of the transmission coil array (figure 2 and 3; column 2 and 3, lines 31-67 and 37-58).

It would have been obvious to one having ordinary skill in the art to adapt teaching of Boskamp with the teaching of Van Den Brink et al to reduce unwanted artifacts to improve imaging data for improving image quality.

As regards to claim 7, Van Den Brink et al teach an MRI apparatus, including a magnetic resonance imaging system having a magnet to create a polarizing magnetic field, a plurality of gradient coils and RF transmitter/receiver system (figure 1, numerals 10, 11, 12 and 13; page 5 and 6, lines 1-34 and 1-10), and RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR image (figure 1, numerals 15, 20 22-27; page 6, 7, lines 11-43 and 1-4). However, Van Den Brink et al do not specifically teach a computer programmed to independently control RF generation by each coil of a transmit coil array such that a collective RF generation across an imaging volume substantially matches a desired excitation profile. Boskamp teaches a computer programmed to independently control RF generation by each coil of a transmit coil array such that a collective RF generation across an imaging volume substantially matches a desired excitation profile (figure 2 and 3; column 2 and 3, lines 31-67 1-60).

It would have been obvious to one of ordinary skill in the art to adapt teaching of Boskamp with the teaching of Van Den Brink et al to reduce unwanted artifacts to improve imaging data for improving image quality.

As regards to claim 17, Van Den Brink et al teach a plurality of transmit coils of a transmission coli array (figure 1, numeral 13). However Van Den Brink et al do not teach a computer readable storage medium having a computer program stored thereon and representing a set of instructions that when executed by a computer causes the computer to control RF transmission such that spatial and temporal variation in a composite B1 field includes a desired excitation profile upon completion of RF

transmission. Boskamp teaches a computer readable storage medium having a computer program stored thereon and representing a set of instructions that when executed by a computer causes the computer to control RF transmission such that spatial and temporal variation in a composite B1 field includes a desired excitation profile upon completion of RF transmission (figure 2-4; column 3-4, lines 7-67 and 1-44).

It would have been obvious to one of ordinary skill in the art to adapt teaching of Boskamp with the teaching of Van Den Brink et al to reduce unwanted artifacts to improve imaging data for improving image quality.

As regards to claims 2-6, 8-16 and 18-23 Van Den Brink et al do not specifically further teach independently driven computer program to design RF pulses applied to linearly arranged coils to achieve spatial weighting by considering changes due to gradient and B1 fields by separately controlled RF amplifiers to specific transmit coils to generate desired excitation by exciting individual coils, connected to separate amplifiers, of the array, and to achieve desired excitation to reduce aliasing. Boskamp teaches independently driven computer program to design RF pulses applied to linearly arranged coils to achieve spatial weighting by considering changes due to gradient and B1 fields by separately controlled RF amplifiers to specific transmit coils to generate desired excitation by exciting individual coils, connected to separate amplifiers, of the array, and to achieve desired excitation to reduce aliasing (figure 2-4, column 2-4).

It would have been obvious to one of ordinary skill in the art to adapt teaching of Boskamp with the teaching of Van Den Brink et al to reduce unwanted artifacts to improve imaging data for improving image quality.

4. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Van Den Brink et al (WO 01/96896), as applied to claim 17 above, in view of Boskamp (US 6,411,090), and further in view of Ibrahim et al; Magnetic resonance Imaging 19 (2001) 1319-13-37.

As regards to claim 24, neither Van Den Brink et al nor Boskamp further teach a computer readable program controlling RF transmission creating 3D composite RF field. Ibrahim et al teach a computer readable program controlling RF transmission creating 3D composite RF field (abstract). It would have been obvious to adapt Ibrahim et al's teaching with the teachings of Van Den Brink et al and Boskemp 3D homogeneous magnetic field to improve imaging data improving image quality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B. Shrivastav whose telephone number is 571-272-2250. The examiner can normally be reached on 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. F. Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 26, 2005

Brij B Shrivastav
Examiner
Art Unit 2859

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